

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously presented) A system for making measurements in a wellbore during the construction of the wellbore comprising:
 - a first sensor located downhole adapted to measure a first downhole parameter;
 - a second sensor located downhole adapted to measure a second downhole parameter;
 - a downhole processor in communication with the first and second sensors configured to calculate a statistical relationship between the first and second downhole parameters;
 - a transmitter located downhole and in communication with the downhole processor the transmitter adapted and configured to transmit the calculated statistical relationship to the surface;
 - a receiver located on the surface positioned and configured to receive the calculated statistical relationship transmitted by the transmitter; and
 - a surface processor in communication with the receiver, the surface processor generating a multi-channel data envelope from the calculated statistical relationship.
2. (Original) A system according to claim 1 wherein the statistical relationship is a covariance.
3. (Original) A system according to claim 1 wherein the downhole processor is further configured to calculate the standard deviation and/or mean of each of the first and second downhole parameters.

4. (Original) A system according to claim 1 wherein the first downhole parameter is torque, and the second downhole parameter is weight on bit.
5. (Original) A system according to claim 1 wherein the first downhole parameter is pressure, and the second downhole parameter is weight on bit.
6. (Original) A system according to claim 1 wherein the first downhole parameter is toolface, and the second downhole parameter is weight on bit.
7. (Original) A system according to claim 1 wherein the first downhole parameter is annular pressure, and the second downhole parameter is downhole flowrate of drilling mud.
8. (Original) A system according to claim 2 wherein the statistical relationship is a time-delayed covariance.
9. (Canceled)
10. (Previously presented) A system according to claim 1, wherein the surface processor is programmed to compare the multi-channel data envelope with data acquired from one or more other wells within a nearby region.
11. (Previously presented) A system according to claim 1, wherein the surface processor is programmed to compare the multi-channel data envelope with measurements acquired by surface equipment.
12. (Previously presented) A system according to claim 1, wherein the processor is configured to display and/or communicate the multi-channel data envelope such that a surface operating parameter relating to drilling the wellbore can be altered.

13. (Previously presented) A system according to claim 12 wherein the multi-channel data envelope is used to make an estimation of bit wear.

14. (Original) A system according to claim 12 wherein the first downhole parameter is torque, the second downhole parameter is weight on bit, and the operating parameter is hookload.

15. (Previously presented) A system according to claim 11 wherein surface processor is programmed to use the compared multi-channel data envelope with the surface data to calculate a frictional correction.

16. (Original) A system according to claim 15 wherein the frictional correction is used to estimate downhole torque and weight on bit.

17. (Original) A system according to claim 15 wherein the frictional correction is used to estimate a relationship between weight on bit and rate of penetration.

18. (Original) The system according to claim 11 wherein the surface acquired data comprises rate of penetration.

19. (Original) The system according to claim 12 wherein the first downhole parameter is toolface, and the second downhole parameter is weight on bit, the processor being further programmed to estimate a toolface correction such that improved toolface corrections can be made by altering weight on bit.

20-27 (Canceled)